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**Datasheet for the decision
of 17 September 2009**

Case Number: T 0701/07 - 3.2.01

Application Number: 95943583.5

Publication Number: 0741655

IPC: B64G 1/24

Language of the proceedings: EN

Title of invention:

Apparatus and methods for in-space satellite operations

Patentee:

The Baron Company, Ltd

Opponent:

EADS Astrium GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)
RPBA Art. 13(1), (3)

Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Admissibility of request filed in oral proceedings (yes)"
"Extended subject-matter (no)"
"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0701/07 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 17 September 2009

Appellant: EADS Astrium GmbH
(Opponent) D-81663 München (DE)

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Respondent: The Baron Company, Ltd.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
28 February 2007 concerning maintenance of
European patent No. 0741655 in amended form.

Composition of the Board:

Chairman: J. Osborne
Members: C. Narcisi
T. Karamanli

Summary of Facts and Submissions

- I. The European patent No. 0 741 655 was maintained in amended form by the decision of the Opposition Division posted on 28 February 2007. Against this decision an appeal was filed by the Opponent on 26 April 2007 and the appeal fee was paid at the same time. The statement of grounds of appeal was filed on 28 June 2007.
- II. Oral proceedings took place on 17 September 2009. The Appellant (Opponent) requested that the decision under appeal be set aside and that the patent be revoked in its entirety. The Respondent requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of its sole request filed during oral proceedings.

The Appellant withdrew his request, submitted with the grounds of appeal, to admit to the proceedings document E6a (Donald M. Waltz, "On-orbit servicing of space-systems", Krieger Publishing Company, 1993, page 277-279), estimating that it was not relevant to the discussion of inventive step of the subject-matter of claim 1.

- III. Claim 1 reads as follows:

"A method for performing in-space proximity operations in order to extend the life of a target satellite with depleted propellant, without performing in-space refuelling or repair functions, the method comprising: operating a remote cockpit to remotely control an extension spacecraft in proximity to an orbiting target satellite;

mechanically connecting the extension spacecraft to the target satellite, forming a docked satellite-spacecraft combination, the extension spacecraft including:
a position control satellite subsystem; and
activating the satellite subsystem of the extension spacecraft to perform all station-keeping functions of the target satellite-spacecraft combination and provide the position control of the satellite-spacecraft combination to extend the life of the target satellite; the extension spacecraft remaining docked to the target satellite throughout the extended life of the target satellite."

Claims 2-4 contain all features of claim 1.

IV. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 does not comply with the requirements of Article 123(2) EPC since the feature "without performing in-space refuelling" extends beyond the content of the application as originally filed. Specifically, the corresponding passage in the patent specification (paragraph [0003]) reads "without performing complicated in-space refuelling" and thus the deletion of the term "complicated" according to said feature of claim 1, implying that all in-space refuelling is excluded by the invention, is not supported by the disclosure of the original application.

The subject-matter of claim 1 likewise lacks an inventive step. In particular document E6 (Donald M. Waltz, "On orbit servicing of space systems", Krieger Publishing Company, 1993, pages 61-65, 106-107, 202-

214, 263-268) discloses a method for performing in-space proximity operations to extend the life of a satellite (page 65, left column, third paragraph) comprising a remote cockpit to remotely control an extension spacecraft in proximity to an orbiting target satellite (page 64, right column, penultimate paragraph). The extension spacecraft is mechanically connected to the target satellite (page 64, right column, penultimate paragraph; page 106, right column; page 209, right column, penultimate paragraph, fig. 8.16), forming a docked satellite-spacecraft combination. The extension spacecraft includes a position control satellite subsystem to provide the position control of the satellite-spacecraft combination (page 64, paragraph bridging left and right column; page 65, paragraph bridging left and right column; page 214, figure 8.18) to extend the life of the target satellite. The remaining features of claim 1 do not involve an inventive step, since E6 explicitly suggests that the extension spacecraft remain docked to the target satellite throughout the extended life of the target satellite (page 65, right column, fourth paragraph). Further, it would also be obvious for the skilled person to ensure that the subsystem of the extension spacecraft performs all station-keeping functions of the target satellite-spacecraft combination which are necessary to achieve proper functioning of the target satellite. Finally, given that the extension spacecraft remains docked to the target satellite throughout its extended life, the skilled person would recognize that no refuelling would be necessary any more, since the combined target satellite-spacecraft unit could be propelled by the extension spacecraft.

V. The Respondent's arguments may be summarized as follows:

The amendment of claim 1 stating that the life of the target satellite is extended "without performing in-space refuelling" is based on paragraphs [0003], [0020] and [0021] of the patent specification, which paragraphs are identical to the corresponding paragraphs of the original application. In the light of these passages the deletion of the term "complicated" appears to be permissible.

The subject-matter of claim 1 involves an inventive step. There is no disclosure in E6 of a position control subsystem of the extension spacecraft, which is activated to provide position control of the satellite-spacecraft combination to extend the life of the target satellite. E6 essentially concerns the replacement of failed units on the target satellite by an orbital manoeuvring vehicle (OMV) which is neither intended to remain docked to the target satellite nor to control the position of the satellite-spacecraft combination. There is no suggestion in E6 to use the OMV as a long term means to keep position control since this would be too costly and economically disadvantageous. The suggestion to use an expendable launch vehicle (ELV) (E6, page 65) solely refers to servicing target satellites by replacing failed units and an ELV likewise does not provide for position control of the target satellite-spacecraft combination. In any event, even if E6 were construed as implying that the OMV takes control of the satellite-spacecraft combination for a period of time, conventional in-space refuelling of the target satellite nevertheless would still be

necessary since this is explicitly disclosed in E6 (page 65, left column, fourth paragraph). The invention avoids the difficulties of in-space refuelling by providing sufficient propellant on the extension spacecraft such that rendezvous, docking and position control of the target satellite-spacecraft combination is made possible and thus extending the life of the target satellite by remaining docked to it. E6, albeit being a comprehensive document of over 200 pages, does not suggest to extend the life of the target satellite according to the method of the invention and the further prior art cited during the opposition proceedings also does not give the skilled person any hint which could lead to the proposed solution.

Reasons for the Decision

1. The appeal is admissible.

2. The Board using its discretion under Article 13(1) RPBA (OJ EPO 2007, 536) decided to admit to the proceedings the Respondent's request. The introduction of features into claim 1 by this request was prompted by the course of the oral proceedings and the features are such that the Board and the Opponent were able to deal with the new subject-matter during the oral proceedings. In particular these features are essentially based on previous auxiliary request III, now withdrawn, as filed on 18 August 2009, and they refer to a central aspect of the invention (patent specification, paragraph [0003]). Therefore, an adjournment of the oral proceedings was not necessary and Article 13(3) RPBA does not apply in the present case.

3. In the judgement of the Board the subject-matter of claim 1 as amended does not offend against Article 123(2) EPC. In the following reference will be made to specific paragraphs or passages of the patent specification whose identical counterpart can be found in the published patent application. The patent specification states that one objective of the invention is "to provide additional stationkeeping propellant for satellites that are approaching their projected end of life due to onboard propellant depletion" (paragraph [0019]), and that the "onboard propellant supply is sufficient to provide for rendezvous and docking of the SIRE (extension) spacecraft with the target satellite and for position control of the docked satellite-spacecraft combination" (paragraph [0020], [0021]). In conjunction with the disclosure in paragraphs [0003], [0007] and [0012] it ensues that the target satellite having depleted its onboard propellant is not refuelled and that the invention uses instead "a simplified apparatus in comparison to prior art techniques which involve refuelling the space satellite" (paragraph [0012]). Consequently, on the basis of the foregoing and with specific regard to paragraphs [0003], [0007] and [0012] it is clear that in the feature of "without performing complicated in-space refuelling", which is derived from paragraph [0003] of the patent specification, the term "complicated" may be omitted, given that, as it may be inferred from the mentioned passages, any in-space refuelling is considered as being complicated. For the given reasons the subject-matter of claim 1 as amended is clearly supported by the content of the original application as filed.

4. The Appellant did not dispute the novelty of the subject-matter of claim 1. The Board notes that neither E6 nor any of the further prior art documents cited during the opposition proceedings discloses the following features in combination: (i) a method for performing in-space proximity operations in order to extend the life of a target satellite with depleted propellant without performing in-space refuelling and wherein the extension spacecraft remains docked to the target satellite throughout the extended life of the target satellite, the position control of the satellite-spacecraft combination to extend the life of the target satellite being provided by the satellite subsystem of the extended spacecraft.

5. The Board considers that the aforementioned features (i) involve in combination an inventive step over the cited prior art. Document E6, which, as remarked by the Respondent, is a rather comprehensive document dealing with on-orbit servicing of space systems, contemplates using expendable launch vehicles (ELV) (E6, page 65, right column, fourth paragraph) for robotic servicing of target satellites, where according to one alternative a service carrier launched on an ELV "remains attached and functions as an extension of the original platform". This passage however does not suggest to dock the extension spacecraft to a target satellite with depleted propellant to extend the life of the same and thus forming a satellite-spacecraft combination. Quite to the contrary, E6 clearly indicates in various contexts (see page 65, left column, fourth paragraph; page 209, left column final paragraph; right column, first paragraph) that refuelling of the

target satellite is intended to take place in the event of fluid depletion. In order to do so the necessary fluid interconnections have to be provided, which process can be complicated and cumbersome, given that different target satellites may require different specific fluid interconnections. The invention permits a lot more flexibility in the handling of old satellites with depleted propellant but which are otherwise fully functional, since the only necessary interface is the docking interface. The invention thus proposes a solution to the mentioned problem which is not suggested by the prior art and which implies obvious advantages over the prior art.

The Appellant's argument that the solution would be obvious for the skilled person in view of the aforementioned passage of E6 (page 65, right column, fourth paragraph) overlooks the fact that the option of using an ELV to launch a service carrier remaining attached to the target satellite is not intended for refuelling purposes according to E6. Indeed, according to said passage this scenario is envisaged as an alternative to the first scenario, where a robot replaces failed units through orbital replacement units (ORUs) and payloads using standard interface connectors. Therefore according to the second scenario obviously the same faulty functions of the target satellite are re-established as according to the first scenario where ORUs are replaced, albeit in a different way. Consequently both these scenarios do not include refuelling at all since in E6 refuelling is always considered as a separate and distinct operation which is mentioned separately from ordinary servicing and from replacement of ORUs (E6, page 65, left column,

fourth paragraph; page 209, right column, first two paragraphs).

In view of the above reasons the subject-matter of claim 1 is considered to involve an inventive step (Article 56 EPC 1973). Since claims 2 to 4 contain all features of claim 1 the same conclusion applies equally to them.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in amended form on the basis of the following documents:
 - claims 1 to 4 and description filed during oral proceedings;
 - drawings as granted.

The Registrar:

The Chairman:

A. Vottner

J. Osborne